





40V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(on)}	I _D T _A = 25°C		
-40V	50mΩ @ V _{GS} = -10V	-6.0A		
-40 V	79mΩ @ V _{GS} = -4.5V	-4.7A		

Description and Applications

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

Features and Benefits

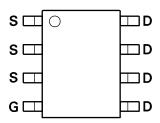
- Low on-resistance
- Fast switching speed
- "Green" component and RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

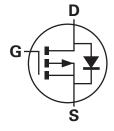
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish Matte Tin annealed over Copper lead frame.
 Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)







Top View



Equivalent Circuit

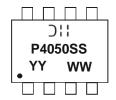
Ordering Information (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel	
DMP4050SSS-13	P4050SS	13	12	2,500	

1. Diodes, Inc. defines "Green" products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.'s "Green" Policy can be found on our website. For packaging details, go to our website.

Marking Information

Note:



DII = Manufacturer's Marking P4050SS = Product Type Marking Code YYWW = Date Code Marking YY = Year (ex: 09 = 2009) WW = Week (01-53)





Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic Drain-Source voltage			Symbol	Value	Unit	
			V_{DSS}	-40	V	
Gate-Source voltage (Note 2)			V_{GS}	±20	V	
		(Note 4)		-6.0		
Continuous Drain current	$V_{GS} = 10V$	$T_A = 70^{\circ}C \text{ (Note 4)}$	I _D	-4.8	Α	
		(Note 3)		-4.4		
Pulsed Drain current V _{GS} = 10V		(Note 5)	I _{DM}	-27.0	Α	
Continuous Source current (Body diode)		(Note 4)	I _S	-4.0	Α	
Pulsed Source current (Body diode)		(Note 5)	I _{SM}	-27.0	А	

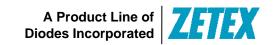
Thermal Characteristics @TA = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit	
Power dissipation	(Note 3)		1.56 12.5	W
Linear derating factor	(Note 4)	P _D	2.8 22.5	mW/°C
Thermal Decistores Lunction to Ambient	(Note 3)	Б.	80	
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	44.5	°C/W
Thermal Resistance, Junction to Lead	(Note 6)	$R_{ hetaJL}$	35	
Operating and storage temperature range		T _J , T _{STG}	-55 to 150	°C

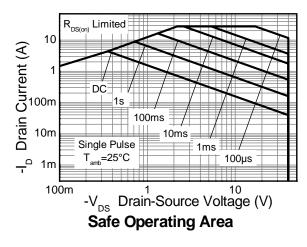
Notes:

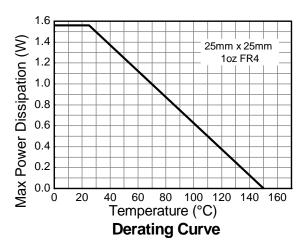
- 2. AEC-Q101 V_{GS} maximum is $\pm 16V$.
- 3. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
- 4. Same as note (3), except the device is measured at t ≤ 10 sec.
 5. Same as note (3), except the device is pulsed with D= 0.02 and pulse width 300 μs. The pulse current is limited by the maximum junction temperature.
 6. Thermal resistance from junction to solder-point (at the end of the drain lead).

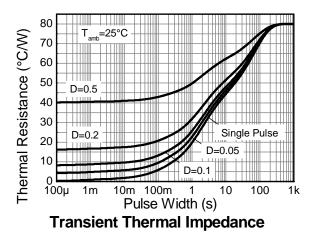


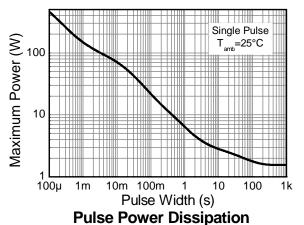


Thermal Characteristics













Electrical Characteristics @T_A = 25°C unless otherwise specified

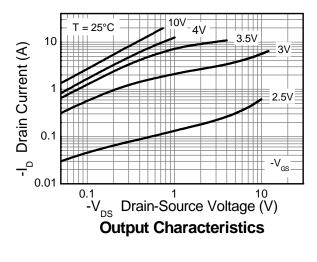
Characteristic	Symbol	Min	Тур	Max	Unit	Test Co	ndition		
OFF CHARACTERISTICS									
Drain-Source Breakdown Voltage	BV _{DSS}	-40			V	$I_D = -250 \mu A, V_{GS} =$: 0V		
Zero Gate Voltage Drain Current	I _{DSS}	_	_	-0.5	μΑ	V _{DS} = -40V, V _{GS} = 0	0V		
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} =$	0V		
ON CHARACTERISTICS	0 000								
Gate Threshold Voltage	$V_{GS(th)}$	-1.0		-3.0	V	I_{D} = -250 μ A, V_{DS} =	V_{GS}		
Static Drain Source On Registernes (Note 7)			0.038	0.050	Ω	V _{GS} = -10V, I _D = -6	A		
Static Drain-Source On-Resistance (Note 7)	R _{DS} (ON)		0.055	0.079	77	$V_{GS} = -4.5V, I_{D} = -5$	5A		
Forward Transconductance (Notes 7 & 8)	g _{fs}		14	_	S	V _{DS} = -15V, I _D = -6/	A		
Diode Forward Voltage (Note 7)	V_{SD}	_	-0.86	-1.2	V	I _S = -6A, V _{GS} = 0V			
Reverse recovery time (Note 8)	t _{rr}		18.5	_	ns	0.5 31/4: 400 4/-			
Reverse recovery charge (Note 8)	Q_{rr}	_	15.6	_	nC	I_{S} = -2.5, di/dt= 100	UA/μS		
DYNAMIC CHARACTERISTICS (Note 8)									
Input Capacitance	C _{iss}	_	674	_	pF	\/ 20\/ \/	0)/		
Output Capacitance	Coss		115	_	pF	V _{DS} = -20V, V _{GS} = 0V f= 1MHz			
Reverse Transfer Capacitance	C _{rss}		67.7		рF	I TIVII IZ			
Total Gate Charge (Note 9)	Qg		6.9		nC	V _{GS} = -4.5V			
Total Gate Charge (Note 9)	Q_g	_	13.9	_	nC	,	V _{DS} = -20V		
Gate-Source Charge (Note 9)	Q _{gs}	_	2	_	nC	V _{GS} = -10V	I _D = -6A		
Gate-Drain Charge (Note 9)	Q_{gd}		3.4	_	nC				
Turn-On Delay Time (Note 9)	t _{D(on)}	_	1.9	_	ns				
Turn-On Rise Time (Note 9)	t _r	_	3.1	_	ns	V _{DD} = -20V, V _{GS} = -10V			
Turn-Off Delay Time (Note 9)	t _{D(off)}	_	31.5	_	ns	I_{D} = -1A, $R_{G} \cong 6.0\Omega$			
Turn-Off Fall Time (Note 9)	t _f		12.6		ns				

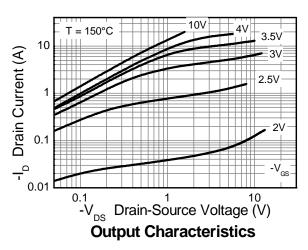
Notes:

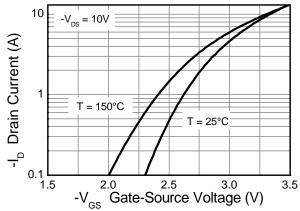
- 7. Measured under pulsed conditions. Pulse width $\le 300 \mu s$; duty cycle $\le 2\%$ 8. For design aid only, not subject to production testing. 9. Switching characteristics are independent of operating junction temperatures.

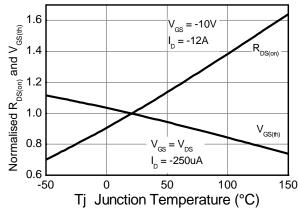


Typical Characteristics



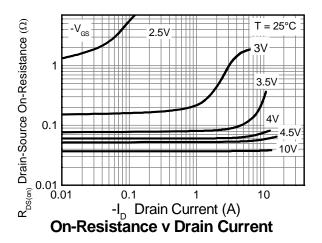


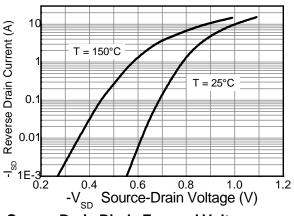




Typical Transfer Characteristics

Normalised Curves v Temperature

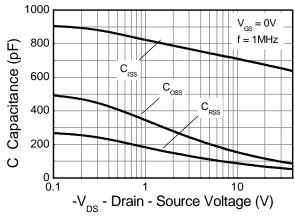




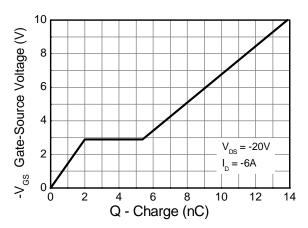
Source-Drain Diode Forward Voltage



Typical Characteristics - continued

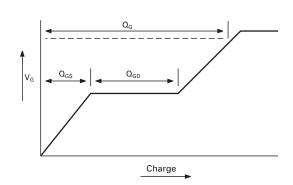


Capacitance v Drain-Source Voltage

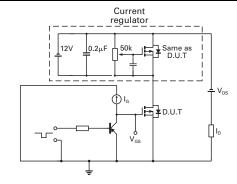


Gate-Source Voltage v Gate Charge

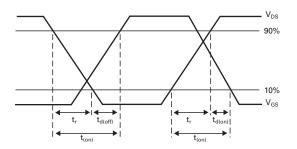
Test Circuits



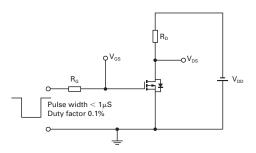
Basic gate charge waveform



Gate charge test circuit



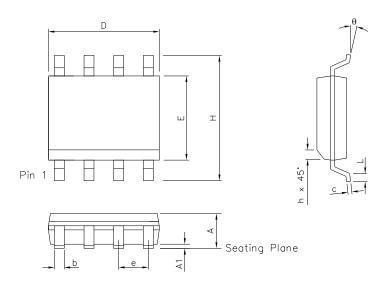
Switching time waveforms



Switching time test circuit

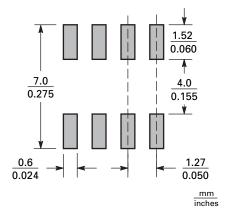


Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
Α	0.053	0.069	1.35	1.75	е	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	С	0.008	0.010	0.19	0.25
Н	0.228	0.244	5.80	6.20	θ	0°	8°	0°	8°
Е	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27	-	-	-		-

Suggested Pad Layout







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